HSMS

EXECUTIVE SUMMARY

NAVAL SUPPLY SYSTEMS COMMAND
CODE 4C3/P. O. BOX 2050
MECHANICSBURG, PA. 17055-0791

Table of Contents

INTRODUCTION

The Hazardous Substance Management System (HSMS) is a Windows compliant, Relational Database Management System (RDBMS) currently being used to track hazardous materials (HMs), hazardous wastes (HWs) and their chemical constituents from cradle to grave at Department of Defense (DoD) installations. The primary objectives of the system are to excel in reporting accuracy, add no additional cost to the product, and provide chemical usage and process data in support of reduced process and product costs. HSMS also provides the means to satisfy state and Federal environmental reporting requirements mandated by Executive Order (EO) 13148 of 22 April 2000, the Pollution Prevention Act (PPA), and the Emergency Planning and Community Right-to-Know Act (EPCRA). Further, HSMS allows DoD installations to monitor the procurement, use, release, and disposal of all hazardous substances, reduce environmental reporting costs, reduce HM inventories, prevent pollution, and integrate smart business practices into hazardous material control and management (HMC&M).

HSMS is the principle software system used at shore installations for implementing the Navy's Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP). A fundamental element of the Navy's life cycle control and management of HM, CHRIMP mandates procedures to control, track, and reduce the variety and quantities of HM in use at facilities. The CHRIMP concept established Hazardous Material Minimization Centers (HAZMINCENs) as the inventory control centers of HM. All departments, tenant commands, and work centers must order HM from the HAZMINCENs; here all transactions are entered into HSMS for tracking purposes, facilitating the centralized HMC&M functions.

BACKGROUND

In October 1991, a Process Action Team meeting was held between representatives from Naval Supply Systems Command, Naval Facilities Engineering Service Center, and Naval shipyards. As a result of this meeting, the Chief of Naval Operations assigned the Naval Computer and Telecommunications Area Master Station LANT (NCTAMS LANT) with the responsibility of designing a prototype integrated system, HSMS, as an investment project using Fiscal Year 1992 pollution prevention funds. The software was developed and is owned by the Defense Environmental Security Corporate Information Management (DESCIM) Program Office, and represents the integration of three existing DoD systems. An automated chemical tracking system, HSMS meets not only the legal reporting requirements of EO 13148, the PPA

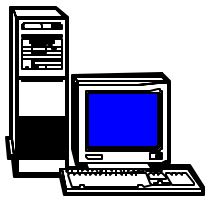
and EPCRA, but the chemical tracking and reporting requirements of the Environmental Protection Agency (EPA), as well. Further, HSMS was designed to achieve the following goals:

- **Reduce HM and HW volumes through source reduction**
- **Comply with regulatory requirements**
- **Protect personnel and the environment**
- **Minimize adverse effects on operations**

HSMS OVERVIEW

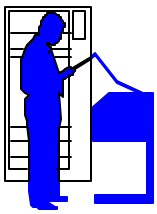
System Requirements

HSMS is a menu drive, fully relational database system for use in a stand-alone or network environment. Recommended system requirements include:



Hardware
- Pentium Server
- Pentium Workstations

Bar Coding Equipment
- Bar code printers (Intermec 4100)
- Bar code readers (fixed-wedge – Intermec 9710)
- Intermec 9710 Keyboard Interface Wedge
- Janus 2020 Portable Barcode Scanners
- 33.6 Internal or External Modem



Optional Equipment
- Multiple CD player/server (must hold a minimum of 8 disks)
- Uninterruptible power supply unit

Software
- DOS 6.X
- Windows 3.1 or greater (Please note: HSMS version 2.3 will require Windows 95 or greater)
- Ad hoc report writing packaged software (Crystal Report Ver. 5.0)
- ORACLE

System Capabilities

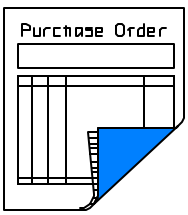
HSMS tracks HM and HW data within base operations from cradle-to-grave, while processing on an item-by-item, chemical-by-chemical, and individual transaction level basis. The system provides a quick, secure and accurate means of accounting for HMs and their component chemicals through their life cycle by tracking all materials ordered, received, stored, issued, used, spilled, and recycled, as well as chemicals on hand, in use, and used. HSMS also accounts for HWs at an installation by tracking wastes from process generation through accumulation, recycling, treatment, and disposition.

Additionally, HSMS maintains data for local Material Safety Data Sheets (MSDSs), and maintains material chemical constituent information, chemical hazard information, activity Authorized Use List (AUL) for HMs, and information on all processes that use HMs and/or generate HW. The system tracks HW lab analyses, and personnel training and pollution prevention information. HSMS also offers simple and logical input screen design, on-line help, and a standard report for generating screen viewed or printed reports; creates bar code and shipping labels; produces EPA, Tier I, Tier II, and Form R reports; uses process algorithms to compute emission reporting data; automatically collects and tabulates weight totals, by chemical, for EPA reports; and prints HW DOT manifests and DD 1348s.

HSMS is a tool capable of analyzing HM flow processes and HM management practices that contribute to HW generation; further, the system may be used to initiate program and process changes to reduce waste streams. Such changes include evaluating existing AULs, procurement procedures, instructions and policies; identifying and substituting HMs with less hazardous or non-hazardous materials; reducing units of issue; evaluating instructions on expired shelf life items; evaluating the potential for reusing expired shelf life materials; reviewing specifications; and evaluating single point HM distribution.

USING HSMS

Material Ordering and Receipt



HSMS use begins when a procurement order is prepared, and material information is entered into the system. HSMS first validates the order against the activity AUL, which may include materials authorized, prohibited, and/or targeted for reduction. If the item is authorized for use, an anticipated receipt file is established in HSMS; if the material is prohibited or targeted, the order is electronically referred to a designated group to identify a potential substitute material.

Next, the ordered material is received and inspected. A description of the material is entered into HSMS and is identified by the manufacturer and product name. Relevant material information, including order number, quantity, container size, specific chemical content, and validation of the MSDS is entered into HSMS. The chemical content information is compared

to the AUL as final authorization of the material received. A bar code is then printed for each container, allowing HSMS to track not only the material itself, but the weight of the chemical constituents that make up the material, as the product moves throughout the facility.

Material, when received, is stored in one or more specific locations throughout the facility. Quantities can be adjusted within HSMS for partially filled containers. Material transfers from one location to another are entered into HSMS, allowing the system to track both individual and cumulative amounts of chemicals and products at any location and at any time. The system also identifies chemicals that exceed the cumulative threshold reporting value.

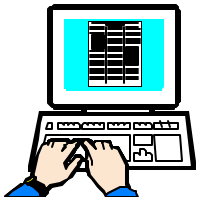
Material Issue and Return

Material(s) received, for which there is an authorized use and work process, is then requested for use on a particular job. Work package numbers are established by the facility through existing business practices. Work processes are linked to a list of site specific processes (SSPs) which are identified processes that use HM or generate HW. Each SSP is associated with process algorithms that predict the fate of the HM as it is consumed. The process algorithms are developed and entered into HSMS to accumulate data for the EPCRA Toxics Release Inventory (TRI) reporting requirements.

HSMS will track the HM issue and ensure that the material is issued for an authorized use. The requested material is issued only in the quantity required to complete the authorized task. At this point, stored chemical information for the product issued, the issued quantity, and the process algorithm integrate to calculate the EPCRA TRI distribution of the issued material's chemical constituents.

Once the particular job for which the material was requested is completed, any remaining material is returned to the issue point. If the excess material can be reused, it is repackaged as necessary and returned to storage; if the excess material is waste, it is transferred into an appropriate waste stream container.

Hazardous Waste Tracking



HSMS inventories HW as it is generated and placed in the appropriate container, and tracks the waste to its ultimate disposition. Adjustments in the amount of waste produced for a specific chemical are made as necessary based on the actual weight of the full container. HSMS also compares the amount of chemical waste projected by the process algorithm against the total waste actually collected. The HW inventory maintained by HSMS then provides access to all of the needed EPCRA reporting information.

Report Generation

HSMS generates state and federal environmental reports mandated by EO 13148 and the PPA, and the Form R, Tier I, and Tier II reports required by EPCRA. Form R reports are produced using a wide range of information contained in HSMS. This data includes facility identification information, chemical-specific information, toxic chemical release information, waste treatment methods and efficiency, and source reduction and recycling information.

HSMS generates Tier I reports using information about hazardous chemicals located at a facility. This data includes estimates of the yearly maximum amounts and the daily average amounts of hazardous chemicals, and the general location of the hazardous chemicals, at a facility. Tier II reports are generated using additional information about the hazardous chemicals at a facility, including chemical names and a description of methods of storage of the hazardous chemicals; additionally, the Tier II reports automatically identify any hazardous chemicals at the facility that have exceeded the threshold planning quantities.

Additional reports generated by HSMS include: suspense date reports, which identify containers, container locations, and the number of days waste has been accumulating or has been stored at a facility; container transaction history reports, which identify all actions taken on containers; quarterly disposal cost reports, which identify the disposal costs associated with containers; and HW disposal reports, which identify the HWs at a facility, and calculate the quantities generated, treated, stored and disposed of.

SYSTEM SOFTWARE MODULES

HSMS consists of six functional modules, which were designed to meet the Navy's goal of reducing HM and HW volumes through source reduction methods. These modules record, track and report on every stage of a material's or chemical's life cycle as it moves through the *procure-store-move-issue-use-discard/recover* path. Each module intercepts and collects data necessary for monitoring and reporting purposes. A brief description of the six modules follows. (This description is for illustrative purposes only and may not reflect the current version of HSMS).

The Safety Module

The Safety Module maintains MSDS Physical Properties records which describe the physical characteristics of HMs (see Fig. 1). This module also contains information incorporated into weight calculations and used to determine the quantities of chemicals at a facility.

This stored data satisfies the Superfund Amendments and Reauthorization Act (SARA) Title III and other EPA reporting requirements. The Safety Module provides safety and environmental personnel with the chemical/material/equipment information needed to safely and responsibly handle, transport and use hazardous substances.

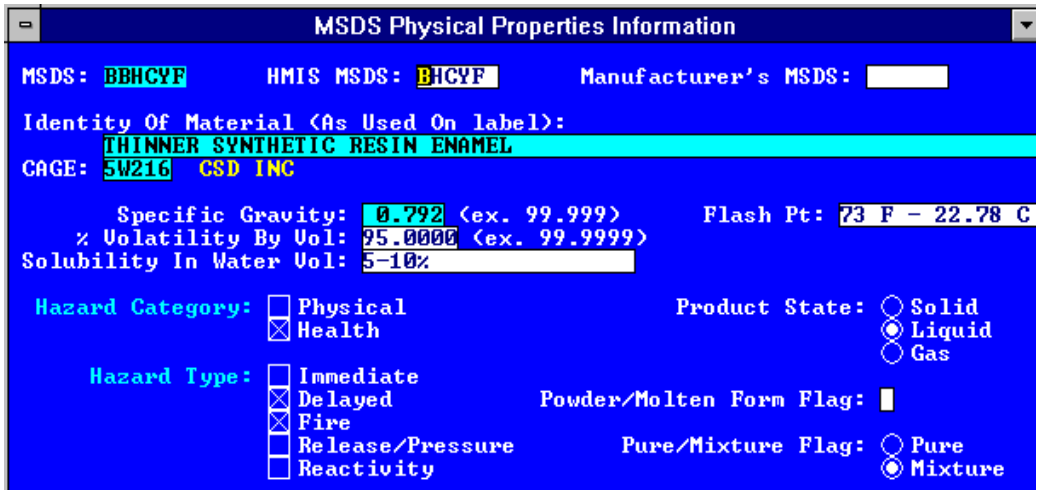


Fig. 1. MSDS Physical Properties Information

The Pollution Module

The Pollution Module defines, establishes and maintains site specific work/job processes, which are used as the primary control for tracking materials, chemicals and waste streams (see Fig. 2). This module also manages Navy or DoD generic processes. A process defines the actual work that uses the material(s) and generates the waste stream(s) associated with a particular physical work procedure. The Navy Generic Process Code and Site Specific Process ID combine to form the Task ID, which HSMS uses as the control mechanism for tracking material usage and waste generation by job. This information becomes input to satisfy EPA, state, and local reporting requirements such as Form R reports, emergency planning and pollution prevention planning. The Pollution Module also identifies permit information for specific processes and permit types, and contains the Master Inventory of chemicals and a National Stock Number listing, including local stock numbers and Unit of Use information.

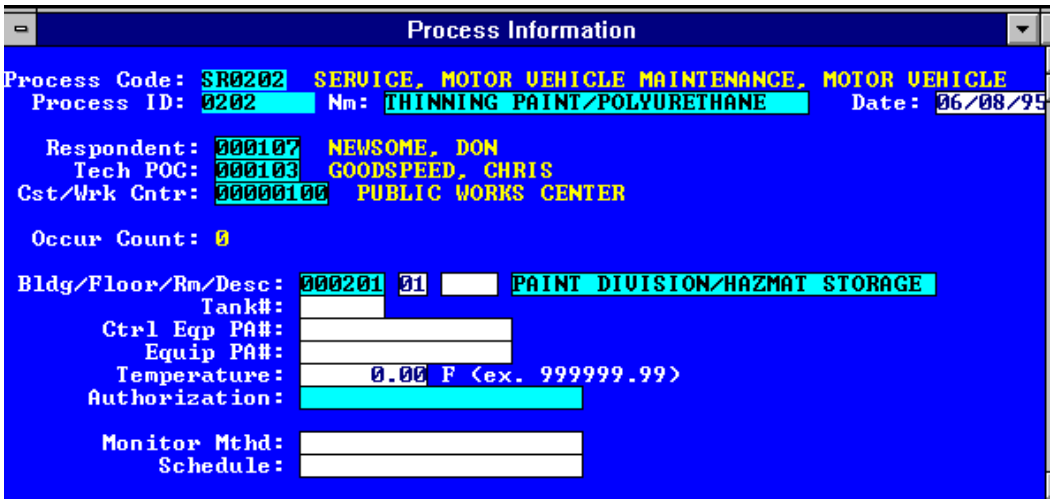


Fig. 2. Process Information

The Materials Module

The Materials Module handles all material transactions in HSMS (see Fig. 3). This module establishes, maintains and tracks the products and materials linked to the work processes created in the Pollution Module. The Materials Module tracks material inventories and usage, and waste generation as usage occurs. Authorization for the procurement and handling of materials is verified against the AUL within this module; additionally, material is received, bar coded, inventoried, assigned to general or specific processes, and committed to a working process within this module. Unused material is reassigned after process completion. Used material is accounted for, and waste is assigned to the proper waste disposal technique. The Materials Module also contains manufacturer listings, a master inventory of materials, and a container inventory.

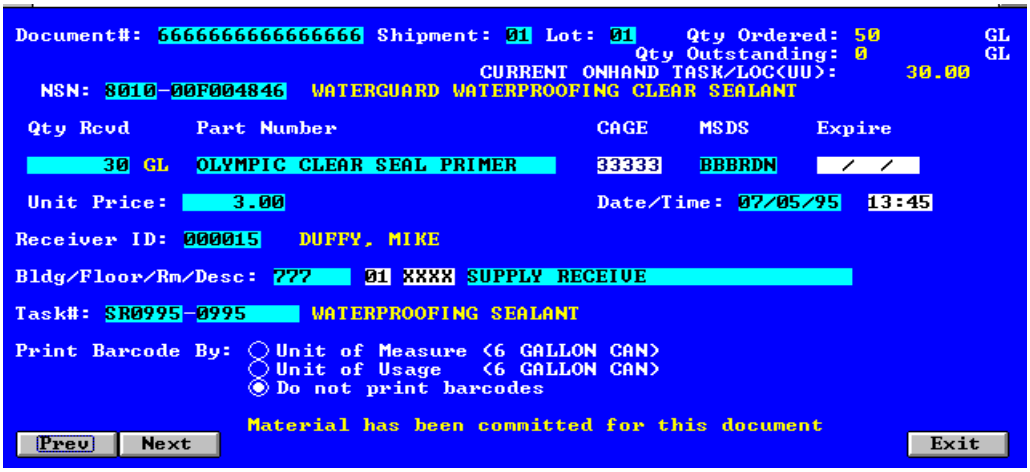


Fig. 3. Material Receipt

The Waste Module

The Waste Module identifies all waste streams generated by a facility in the course of daily operations (see Fig. 4). This module accounts for the categorization, transportation methods, and final disposition of HW in accordance with EPA and Department of Transportation (DoT) rules and regulations. A major feature is the ability to track and account for chemical wastes by constituent, volume, and quantity, from a process to a specific waste container. Every container is associated with a particular waste stream and the process from which it originated. The weight of each hazardous chemical is calculated using the constituent percentage data assigned to each waste stream. Additional information entered into and stored in the Waste Module includes sampling data, contract information, and storage locations.

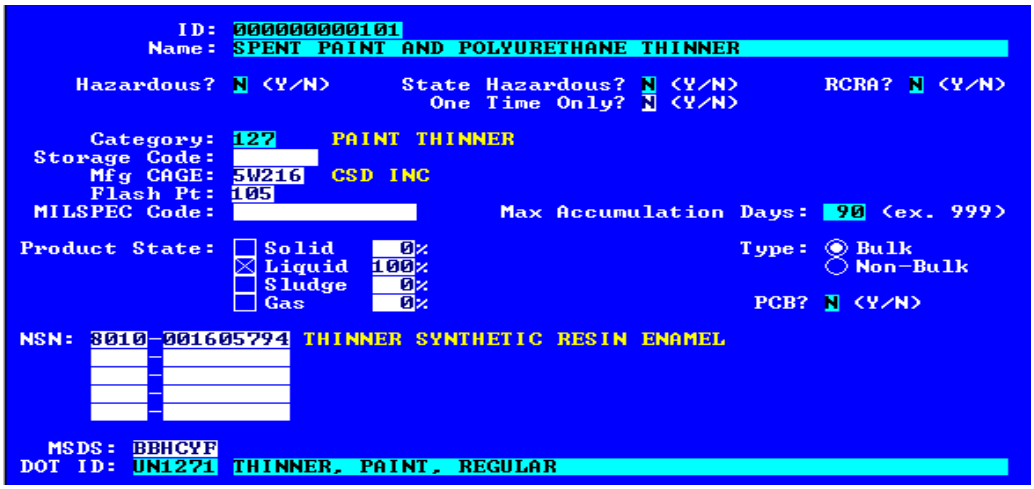


Fig. 4. Waste Stream Classification Information

The Reference Module

The Reference Module provides maintenance functions on information used as reference data throughout HSMS (see Fig. 5). This module contains personnel, location and cost center information. Each item is referred to by every other module and is changed on a regular basis. The Reference Module also records and tracks HM-related training provided to facility personnel.

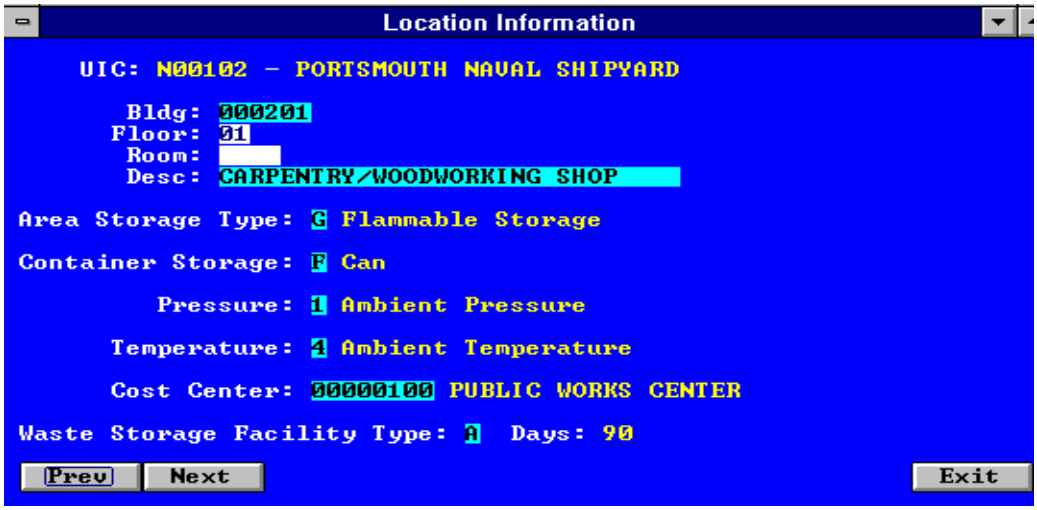


Fig. 5. Location Information

The Admin Module

Functions used in everyday system operations are maintained in the Admin Module (see Fig. 6). Within this module, access to User tables and Static Data tables is limited to control modifications. The User tables allow the system administrator (SA) to define user access rights in accordance with job requirements, and to reset passwords when needed. The Static Data tables allow the SA to manage data preloaded into the static tables, which are located in each module and contain information needed to track HMs and HWs and their chemical constituents within HSMS. The Help function and the primary EPA reports are also managed through the Admin Module. Form R, Tier I and Tier II reports are generated by a program built into HSMS; additionally, ad hoc reporting, such as site specific queries and local government requirements, may be performed with the use of any query/report package compatible with the installed database.

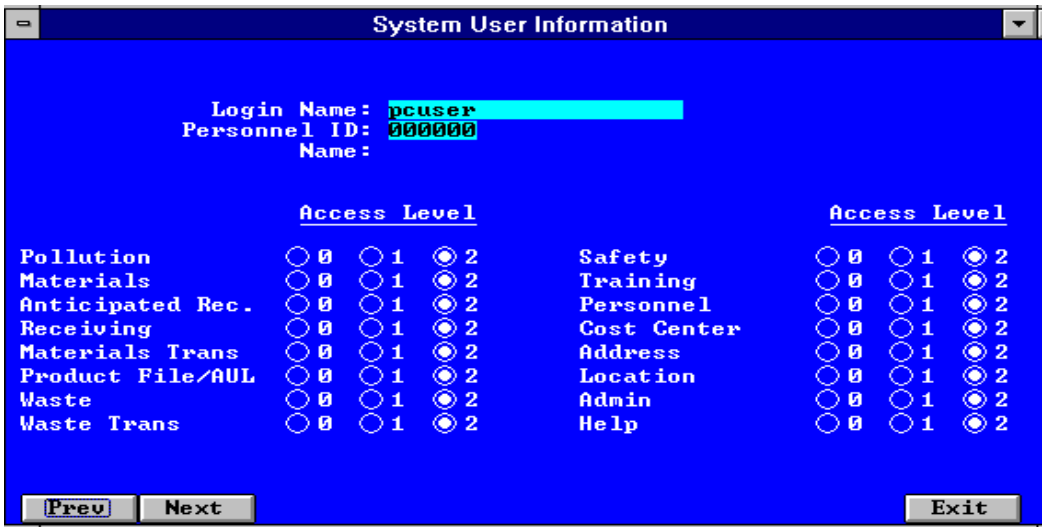


Fig. 6. System User Information

CONCLUSION

HSMS is a true cradle to grave system which tracks HMs and HWs and their constituent chemicals on an installation. The system consists of six modules that record, track, and report on all stages of a material's or a chemical's life cycle, providing information necessary for monitoring and reporting purposes. The primary objectives of the system are to satisfy state and federal environmental reporting requirements mandated by EO 13148, the PPA, and EPCRA, add no additional cost to the product, and provide chemical usage and process data to support a reduction in process and product costs. Additionally, HSMS may be used to examine an installation's HM and HW management programs, evaluate base waste segregation practices, and identify the types and annual quantities of wastes disposed of, in support of pollution prevention through source reduction. Use of HSMS ultimately allows DoD installations to monitor the procurement, use, release, and disposal of all hazardous substances, reduce environmental reporting costs, reduce HM inventories, prevent pollution, and integrate smart business practices into HMC&M.